IN THE CLAIMS:

1-31 (Cancelled)

32. (New) A communication signal receiver, comprising:

circuitry for receiving a communication signal;

a mixer coupled to the communication signal and a first reference signal, wherein the mixer generates a received signal in response to the communication signal and the first reference signal;

a processor having a foreground processing section for performing real-time automatic frequency control on the received signal and a background processing section for performing latent automatic frequency control on the received signal, wherein each of the foreground and background processing sections generate a frequency control signal for adjusting the frequency offset of the received signal, the frequency control signal generated by the background processing section being the inverse of the frequency control signal generated by the foreground processing section; and

a frequency synthesizer coupled to the frequency control signal from the foreground processing section for generating the first reference signal.

33. (New) The Communication signal receiver of claim 32, wherein the circuitry for receiving a communication signal comprises:

an antenna for receiving a communication signal;

a bandpass filter coupled to the antenna for generating a band limited signal from the communication signal; and

a downconverter coupled to the band limited signal for downconverting the frequency of the communication signal to an intermediate frequency range.

34. (New) The Communication signal receiver of claim 33, wherein the downconverter is coupled to the frequency synthesizer and receives a second reference signal for use in downconverting the communication signal to the intermediate frequency range.

35. (New) The Communication signal receiver of claim 33, wherein the circuitry for receiving a communication signal further comprises:

an intermediate frequency channel filter for filtering the downconverted communication signal; and

an adjustable gain stage for adjusting the gain of the communication signal.

36. (New) The communication signal receiver of claim 32, wherein the mixer is a quadrature mixer having a first mixer for receiving the communication signal and the reference signal and a second mixer for receiving the communication signal and a phase-shifted version of the reference signal, and wherein the received signal generated by the quadrature mixer comprises an in-phase component generated by the first mixer and a quadrature-phase component generated by the second mixer.

37. (New) The Communication signal receiver of claim 32, wherein the frequency synthesizer further comprises:

a first oscillator coupled to the frequency control signal from the foreground processing section for generating a variable oscillator signal as a function of the frequency control signal;

a second oscillator for generating a fixed oscillator signal; and

a mixer coupled to the variable oscillator signal and the fixed oscillator signal for generating the first reference signal.

38. (New) The Communication signal receiver of claim 32, wherein the processor is a digital signal processor and the foreground and background processing sections are implemented by the digital signal processor.

39. (New) The Communication signal receiver of claim 32, wherein the processor further comprises a buffer coupling the foreground processing section to the background processing section.

40. (New) The Communication signal receiver of claim 39, wherein the buffer is a FIFO buffer.

41. (New) The Communication signal receiver of claim 32, wherein the foreground processing section further comprises:

a filter/converter coupled to the received signal for generating a filtered and digitized version of the received signal; and

an automatic frequency control block coupled to the filtered and digitized version of the received signal for generating the frequency control signal of the foreground processing section.

42. (New) The Communication signal receiver of claim 41, wherein the filter/converter is a combination low pass filter and analog-to-digital converter.

43. (New) The Communication signal receiver of claim 41, wherein the received signal includes an in-phase component and a quadrature-phase component, and wherein the filter/converter further comprises:

a first anti-aliasing filter and analog to digital converter coupled to the in-phase component of the received signal; and

a second anti-aliasing filter and analog to digital converter coupled to the quadrature-phase component of the received signal.

44. (New) The Communication signal receiver of claim 43, wherein the filter/converter further comprises a channel filter coupled to both the first and second analog-to-digital converters for providing additional filtering the in-phase and quadrature phase components of the received signal.

45. (New) The Communication signal receiver of claim 41, wherein the frequency control signal provided by the automatic frequency control block of the foreground processing section provides instantaneous frequency offset estimates for the received signal.

46. (New) The Communication signal receiver of claim 45, wherein the automatic frequency control block performs averaging and low pass filtering of the frequency control signal.

47. (New) The Communication signal receiver of claim 45, wherein the frequency control signal generated by the automatic frequency control block is a digital signal; the foreground processing section further comprising a digital to analog converter for converting the frequency control signal from a digital signal into an analog signal.

48. (New) The Communication signal receiver of claim 32, wherein the background processing section generates a plurality of frequency control signals for adjusting the frequency offset of the received signal, the background processing section further comprising:

an automatic frequency control circuit coupled to the received signal for generating a first frequency control signal which is the inverse of the frequency control signal generated by the foreground processing section;

a frame sync detector for generating a second frequency control signal when a frame sync signal is detected in the received signal;

a decision-directed automatic frequency control circuit for generating a third frequency control signal; and

a frequency synthesizer coupled to the first, second and third frequency control signals and the received signal for generating a background processed received signal.

49. (New) The Communication signal receiver of claim 48, wherein the frequency synthesizer further comprises:

a summer coupled to the first, second and third frequency control signals for generating a combined frequency control signal;

an oscillator, coupled to the combined frequency control signal, for generating a variable oscillator signal; and

a mixer coupled to the received signal and the variable oscillator signal for generating the background processed received signal.

50. (New) The Communication signal receiver of claim 48, wherein the decision directed automatic frequency control block receives the background processed received signal as its input.

51. (New) The Communication signal receiver of claim 48, wherein the background processing section operates in two modes, a synchronized mode and an unsynchronized mode, depending upon whether the frame sync detector has detected a frame sync signal in the received signal.

52. (New) The Communication signal receiver of claim 51, wherein the second frequency control signal is only generated by the frame sync detector when the background processing section is operating in the synchronized mode.

53. (New) The Communication signal receiver of claim 48, wherein the background processing section further comprises:

a soft decision detector block coupled to the background processed received signal for converting the background processed received signal into soft symbol values.

54. (New) The Communication signal receiver of claim 51, wherein the decision directed automatic frequency control block generates the third frequency control signal during the synchronized mode to track changes in the background processed received signal.

Respectfully submitted,

JONES DAY

David B. Cochran
(Reg. No. 39,142)

Jones Day
North Point, 901 Lakeside Avenue
Cleveland, Ohio 44114
(216) 586-7506